United States Patent [19]
Watts

[11] **Patent Number:** **4,825,769**
[45] **Date of Patent:** **May 2, 1989**

[54] **RAIL ASSEMBLY FOR USE IN A RADIOACTIVE ENVIRONMENT**

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[21] Appl. No.: **79,303**

[22] Filed: **Jul. 29, 1987**

[51] **Int. Cl.**[4] **E01B 25/22**; G21C 19/00
[52] **U.S. Cl.** **104/107**; 104/94; 238/310; 212/205; 376/260
[58] **Field of Search** 376/260, 271, 268, 264, 376/261, 463; 104/106, 107, 108, 94; 212/140, 142.1, 205; 238/310, 315

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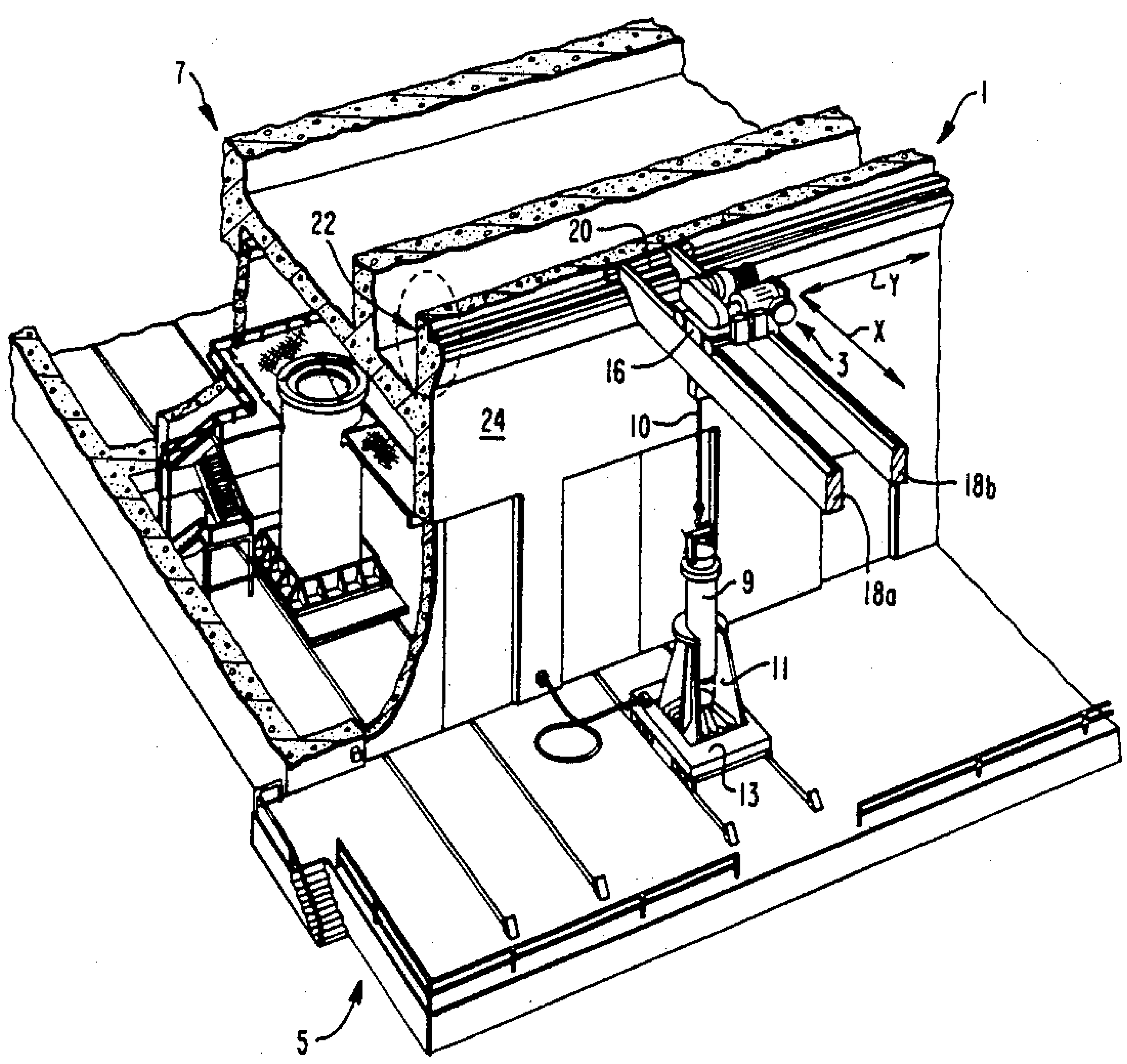
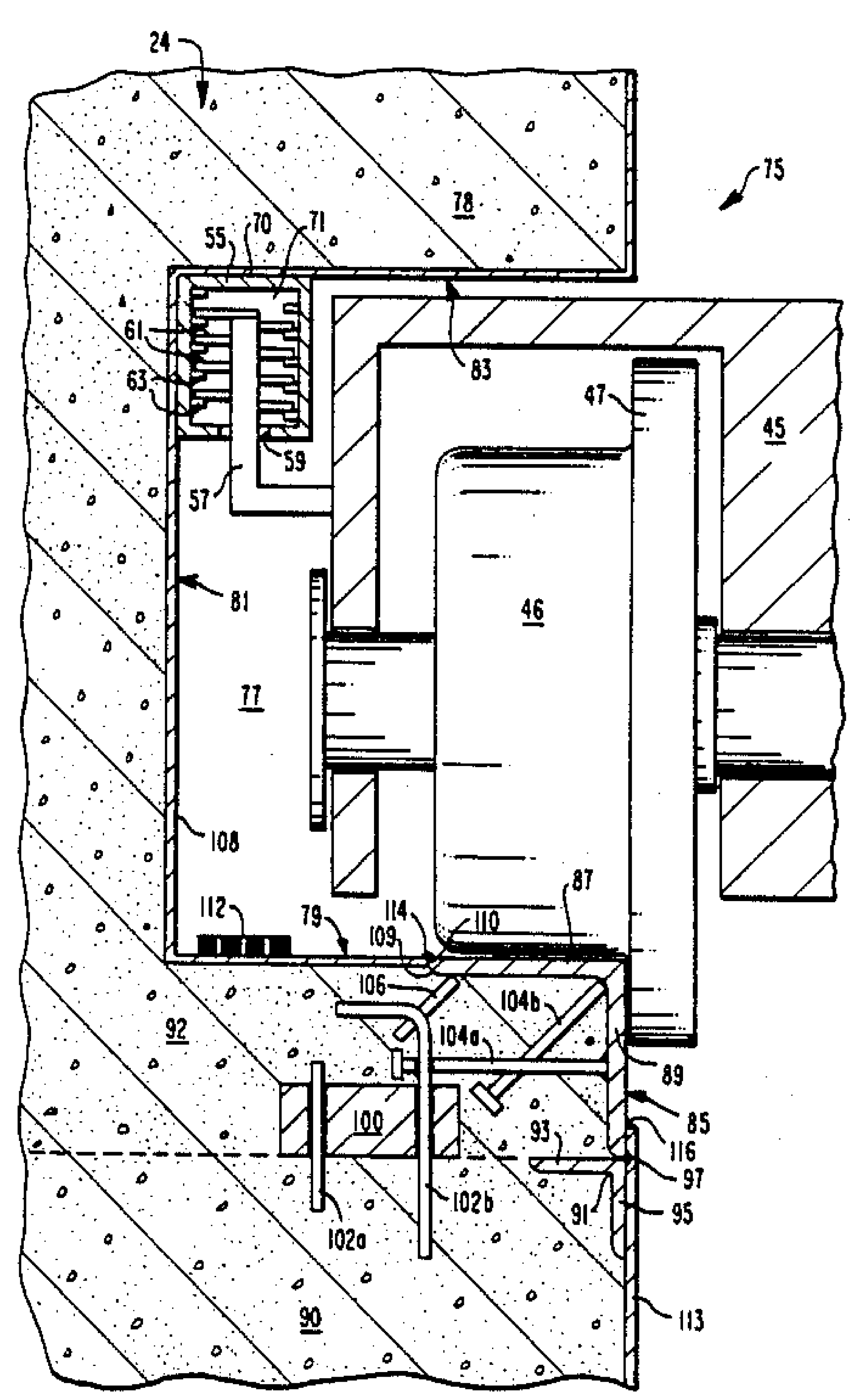
[57] **ABSTRACT**

An improved rail assembly and method of construction thereof is disclosed herein that is particularly adapted for use with a crane trolley in a hot cell environment which is exposed to airborne and liquidborne radioactive contaminants. The rail assembly is generally comprised of a support wall having an elongated, rail-housing recess having a floor, side wall and ceiling. The floor of the recess is defined at least in part by the load-bearing surface of a rail, and is substantially flat, level and crevice-free to facilitate the drainage of liquids out of the recess. The ceiling of the recess overhangs and thereby captures trolley wheels within the recess to prevent them from becoming dislodged from the recess during a seismic disturbance. Finally, the interior of the recess includes a power track having a slot for receiving a sliding electrical connector from the crane trolley. The power track is mounted in an upper corner of the recess with its connector-receiving groove oriented downwardly to facilitate the drainage of liquidborne contaminants and to discourage the collection of airborne contaminants within the track.

23 Claims, 3 Drawing Sheets





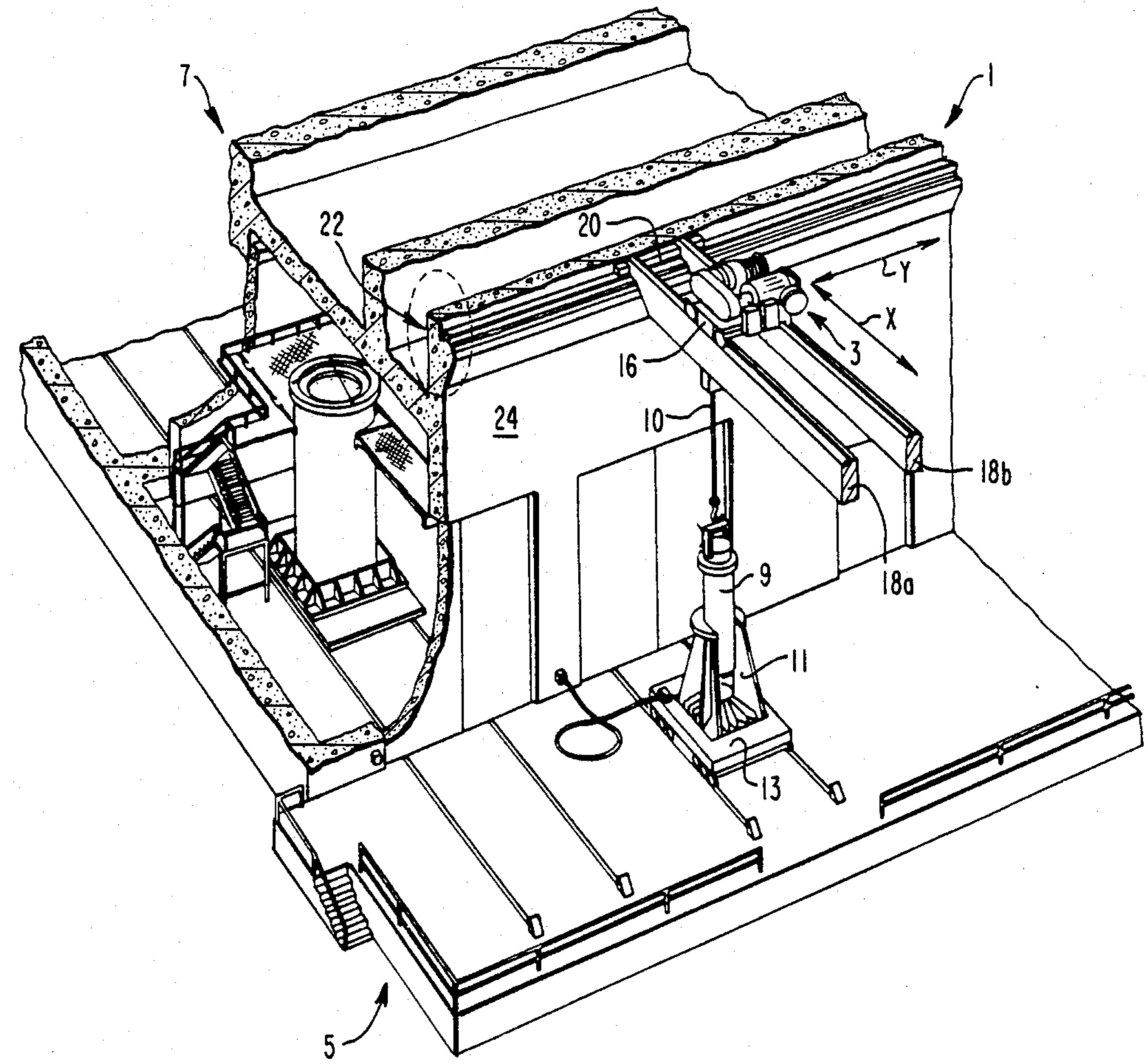


FIG. 1

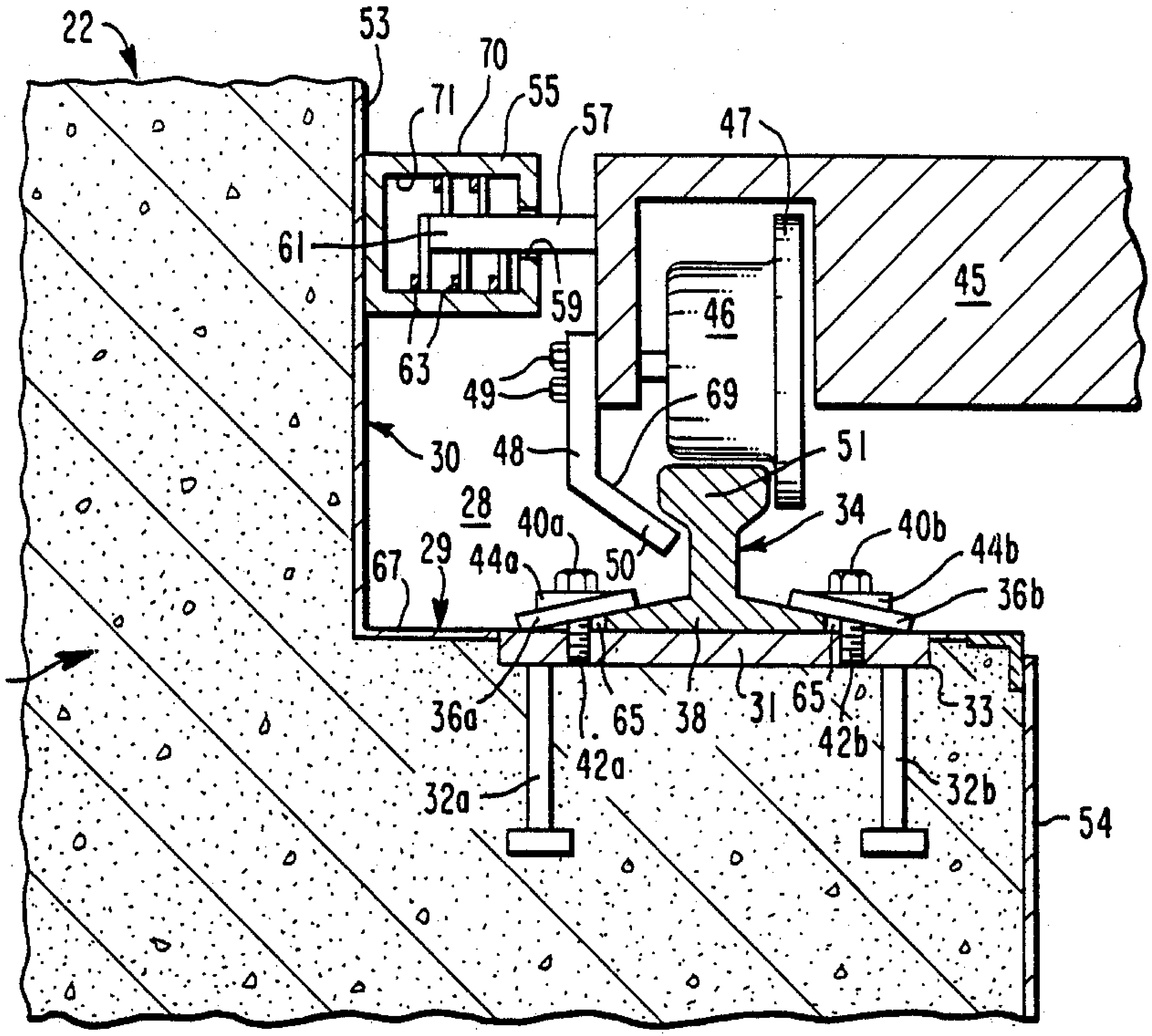


FIG. 2
PRIOR ART

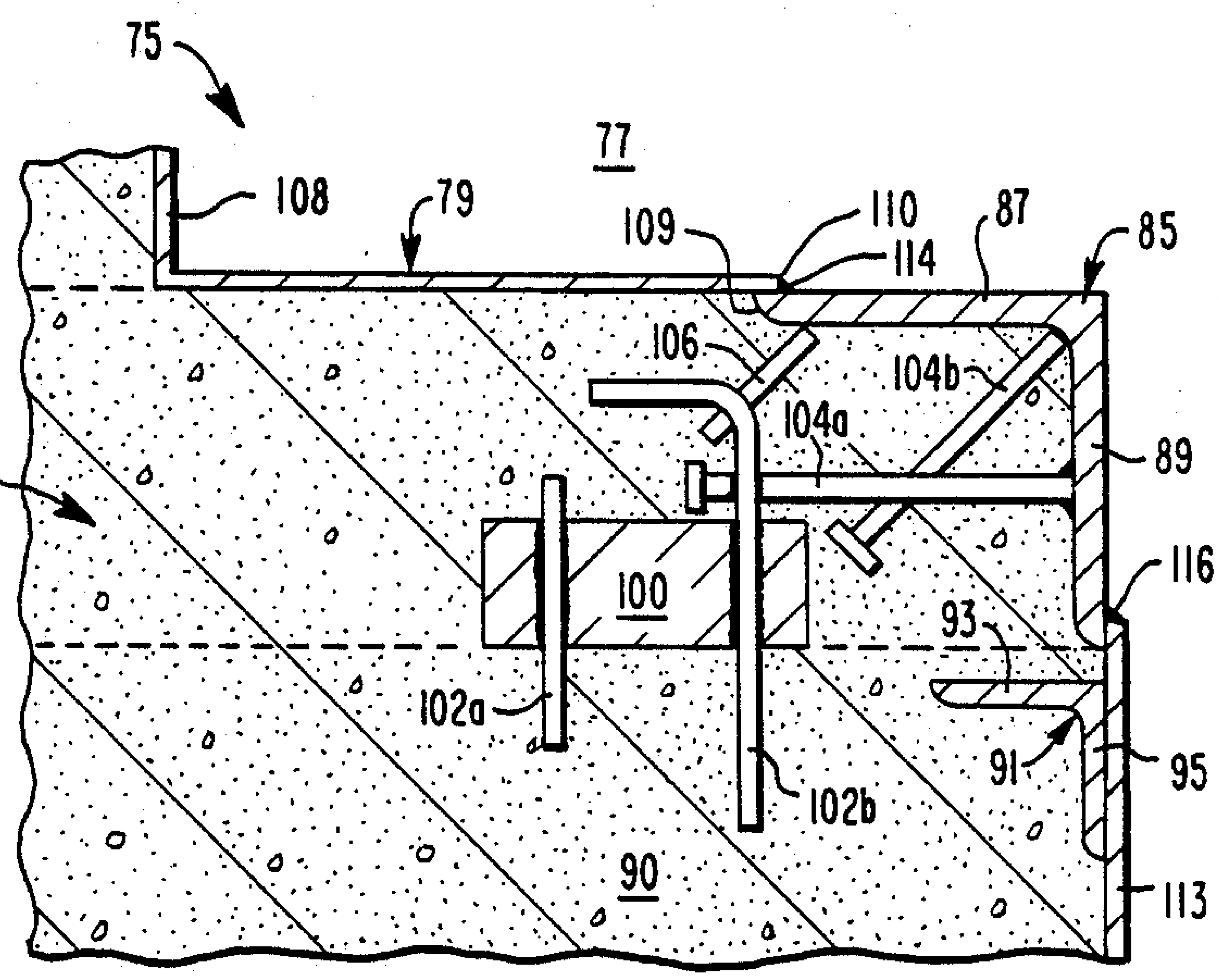
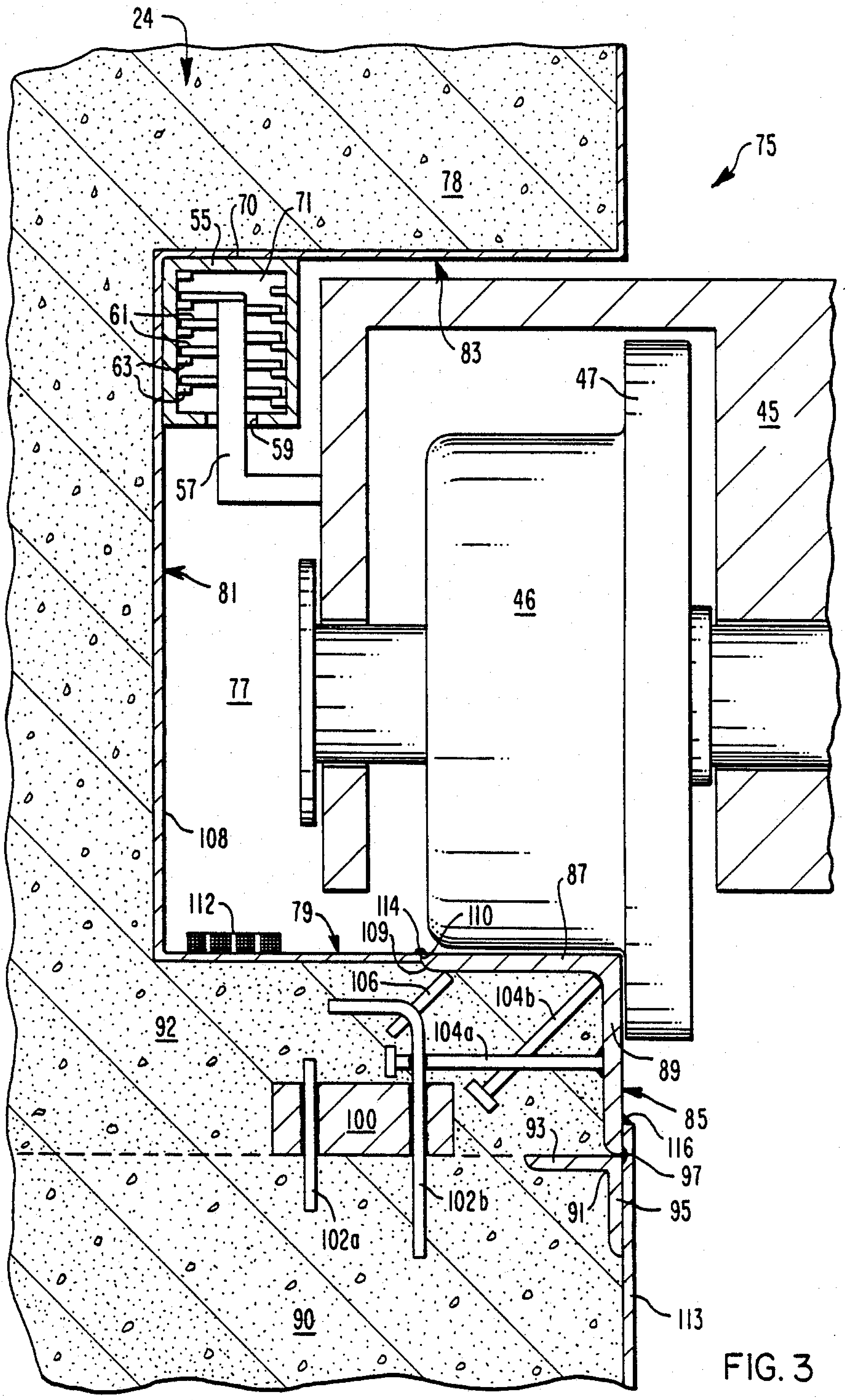


FIG. 4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110
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104b
92
104a
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100
85
116
93
97
91
95
102b
102a
113
90

FIG. 3

RAIL ASSEMBLY FOR USE IN A RADIOACTIVE ENVIRONMENT

BACKGROUND OF THE INVENTION

This invention was made or conceived in the performance of contract number DE-AC06-84-RL-10436 with the U.S. Departmentof Energy.

This invention relates to an improved rail assembly for use with a bridge crane in a radioactive environment, such as a "hot cell" from where nuclear fuel assemblies are repaired or reconstituted.

Nuclear waste disposal facilities typically have special rooms, known as "hot cells", where the radioactive fuel in the fuel rods of used nuclear fuel assemblies may be reprocessed. Such hot cells typically include bridge-type cranes for lifting the long, rectangular fuel assemblies out of shipping casks and lowering them onto special work areas, where workers manipulae individual fuel rods with robotic arms visually monitored through lead-shielded glass.

The bridge cranes used in such hot cells are similar in many respects to conventional bridge cranes that are capable of moving a cable and hook along both an X-axis and a Y-axis. Specifically, such cranes include a first electrically operated trolley chassis that carries the hook and cable and whose wheels ride upon a pair of parallel, beam-type rails in an X-axis direction. The beam-type rails are orthogonally disposed over a pair of mutually opposing support walls oriented in a Y-axis direction. The ends of the parallel beam-type rails are inn turn mounted onto second and third trolleys, each of which rides upon a rail assembly mounted along the crown of one of the mutually opposing support walls. The X-axis movement of the cable and hook of the crane afforded by the first trolley over the beam-type rails, and the Y-axis movement of the beam-type rails afforded by the second and third trolleys over the opposing support walls allows the crane hook to be positioned over any desired point on the floor of the cell.

Each wall-type rail assembly is generally formed by a rail having an I-shaped cross-section which is mounted on the floor of an L-shaped recess in the upper portion of its respective wall. A power track is mounted on the side wall of each L-shaped recess parallel to the I-beam-shaped rail. Each trolley chassis includes an electrical connector which slidably fits into a slot in the power track. To prevent the trolleys from falling off their respective rails during a seismic disturbance, each trolley chassis includes angular brackets which capture the underside of the load-bearing top flange of its respective Ishaped rail.

While such prior art bridge cranes satisfactorily perform their intended mechanical function of lifting, moving, and lowering the heavy fuel assemblies to desired positions within within the hot cell, the applicant has observed that the mechanical configuration of the rail assemblies used in such prior art cranes creates significant problems whenever the hot cell is periodically subjected to a decontamination procedure. Such decontamination of the hot cell becomes necessary as a result of the inadvertent release of fine, highly radioactive particles in the air of the cell due to the rupture or breakage of a fuel rod. Such dust-like, airborne particles of radioactive fuel render the radiation level in the hot cell unacceptably high. The decontamination is carried out by spraying all the surfaces within the hot cell with a decontamination liquid which chemically captures and rinses away the radioactive elements present in the dust-like particles of fuel.

However, the many crevice regions inherent in the prior art rail assemblies provide many areas for the dust-like particles of nuclear fuel to collect which are difficult to spray directly with such a decontamination liquid. Some particularly difficult regions to decontaminate include the areas between the rails and the sides of the L-shaped recesses which house them, the regions between the angular, seismicclamp brackets and the upper flange of the rails, and the interior of the power tracks. Even when these areas are sprayed directly with decontamination liquid, they provide numerous "crud traps" where small puddles of the liquid can accumulate and eventually evaporate, thereby leaving deposits of concentrated radioactive material.

Still another deficiency of such prior art assemblies is the fact that they are relatively difficult to construct. In such assemblies, the I-beam shaped rail is mounted over the top surface of a bed plate that is cast in place on the floor of the L-shaped recess when the concrete that forms the upper portion of the wall is poured. Experience has shown that it is very difficult to maintain the top surface of the rail-supporting bed plate both flat and level as the concrete forming upper portion of the wall is poured. Any resulting irregularities interfere with the crane trolley's ability to smoothly travel along the rail during operation. These effects become more serious when very heavy loads are carried and handled by the crane.

Clearly, what is needed is an improved rail assembly for use with the trolley of a bridge crane which provides a minimum number of "crud traps" for airborne or liquidborne radioactive contaminants to collect and settle. Ideally, such a rail assembly should provide a means for positively maintaining the wheels of the trolley over the load-bearing surfaces of the rails even in the event of a seismic disturbance or other natural catastrophe. The load-bearing bed of such a rail assembly should be simple and easy to manufacture flat and level within small tolerances. Finally, the design of the improved rail assembly should be compatible with any commercially available trolley chassis to avoid the necessity of expensive, custom-made components.

SUMMARY OF THE INVENTION

Generally, the invention is an improved rail assembly and method for construction thereof for use with a bridge crane that operates in a radioactive environment which is easy both to construct and to decontaminate. The rail-assembly comprises a support wall, and an elongated, rail housing recess in said wall structure having a floor that is defined at least in part by the load-bearing surface of a rail. The floor is substantially flat, level, and crevice-free to facilitate the drainage of liquids out of the recess. The rail-housing recess may further include an overhanging portion that defines a ceiling which captures and thereby secures any trolley wheels against disengagement from the rails in the event of a seismic disturbance. In the preferred embodiment, the recess has a C-shaped cross-section rather than the L-shaped cross-section associated with the prior art.

The C-shaped recess may include a power track means having a slot along its longitudinal axis for receiving a sliding electrical connector from the trolley chassis. To facilitate the drainage of liquidborne contaminants, the power track means is preferably mounted in the recess above the recess floor with its connector-receiving slot oriented downwardly. In the preferred embodiment, the C-shaped recess is lined with a corrosion-resistant material, such as stainless steel. Moreover, the rail is supported within the wall by a matrix formed from a plurality of reinforcing members and a moldable construction material, such as concrete. The reinforcing members may be directly connected to the rail, and serve to support and properly position the rail during the pouring of the moldable construction material over the support members.

In the method of the invention, the reinforcing members are first secured in a base portion of the support wall. Next, an angular rail having a load-bearing flange is placed along the base portion of the support wall and connected to the reinforcing members in order to secure it in a desired position over the base portion with its load-bearing flange oriented flat and level. A moldable construction material such as concrete is then poured over the rail and reinforcing members to form a supporting matrix therearound. However, before the moldable construction material hardens, it is substantially leveled off with the load-bearing surface of the rail in order to form a flat, level, and crevice-free floor for the recess.

In the final steps of the method of the invention, a form fabricated from stainless steel sheet material and having a C-shaped cross-section is secured onto the base portion of the wall, and an additional amount of moldable construction material is poured around the outside of the sheet material to fabricate both the side wall of the recess, and an overhanging portion that defines a wheel-capturing ceiling which secures the trolley wheels over the rail in the event of a seismic disturbance. Preferably, this same stainless-steel form is left in the recess so as to provide corrosion-resistant sheathing around the ceiling and side wall thereof. Finally, the power track of the assembly is secured in the upper corner of the C-shaped recess with its connector-receiving slot oriented downwardly to facilitate the drainage of any decontamination liquid sprayed therein.

BRIEF DESCRIPTION OF THE SEVERAL FIGURES

FIG. 1 is a perspective view of a fuel storage and salvaging facility, illustrating a prior art rail assembly used in connection with a bridge crane mounted over a hot cell;

FIG. 2 is an enlarged, cross-sectional side view of the wall-type rail assembly circled in FIG. 1;

FIG. 3 is a cross-sectional side view of a first embodiment of the improved wall-type rail assembly of the invention; and

FIG. 4 is a partial cross-sectional side view of an alternate embodiment of this improved rail assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to FIGS. **1** and **2**, wherein like figures designate like components throughout all the several figures, the invention is an improvement of the rail assembly **1** used in connection with a bridge or trolley-type crane **3** in a hot cell **5** of a fuel storage and salvaging facility **7**. Such bridge cranes **3** typically have a lifting capability of 150 tons, and are used to lift and lower shipping casks **9** containing spent nuclear fuel assemblies (not shown) that were used to heat the water in the primary side of a nuclear steam generator. FIG. **1** specifically shows a shipping cask **9** being lowered via the cable and hook **10** of the bridge crane **3** into a cask adapter **11** situated on top of a mobile cart **13**.

The bridge crane **3** includes both a beam trolley **16**, which serves to move the cable and hook **10** along a pair of parallel, beam-type rail assemblies **18*a*, 18*b*** oriented along an X-axis, as well as a pair of wall trolleys **20** (only one of which is shown) that move both the beam trolley **16** and the beam-type rail assemblies **18*a*, 18*b*** along a pair of wall-type rail assemblies **22** oriented along a Y-axis. The X-axis movement of the cable and hook **10** afforded by the beam trolley **16** along the beam-type rail assemblies **18*a*, 18*b*** coupled with the Y-axis movement afforded the cable and hook **10** along the wall **24** by the wall trolleys **20** allow the operator of the bridge crane **3** to position the cable and hook **10** over practically any desired point of the floor **26** of the hot cell **5**.

FIG. **2** illustrates in greater detail the prior art wall-type rail assembly **22** shown in FIG. **1**. Such wall-type rail assemblies **22** include an L-shaped recess **28** provided along the top edge of the wall **24** which has a floor **29**, and an orthogonal side wall **30**. A rectangular stainless steel bed plate **31** is usually cast in place in the floor **29** of the recess **28** when the top of the concrete wall **24** is poured. To securely anchor the bed plate **31** in place within the concrete wall **24**, a plurality of anchors in the form of Nelson studs **32*a*, 32*b*** are tack welded to the bottom of the bed plate **31** every six inches or so. These studs **32*a*, 32*b*** are immersed in concrete when the top portion of the wall **24** in poured, as is the bottom portion of the bed plate **31**. When the concrete forming the top portion of the wall **24** hardens, these studs **32*a*, 32*b*** effectively secure the bed plate **31** into a complementary rectangular cavity **33** located beneath the floor **29** of the recess **28**. A standard No. 80 rail **34** having a generally I-shaped cross section is mounted over the top surface of the bed plate **31** by canted clamp plates **36*a*, 36*b*** which capture the lower flange **38** of the rail **34**. Each of these clamp plates **36*a*, 36*b*** is secured in place by nuts **40*a*, 40*b*** that are threadedly engaged onto studs **42*a*, 42*b*** screwed into tapped holes in the bed plate **31**. Wedge-shaped washers **44*a*** and **44*b*** ensure that the nuts **40*a*, 40*b*** apply a uniform clamping force over the top surfaces of the canted clamp plates **36*a*** and **36*b***.

In operation, the wheels **46** of the chassis **45** of the wall trolley **20** roll over the top surface of the rail **34** as shown. Each of these wheels is cast steel and is circumscribed by an annular flange **47** which cooperates with the inner edge of the rail flange **51** to guide the wheel **46** over the rail **34**. To ensure that the wheels **46** of the wall trolley **20** will not become disengaged from the rail **34** in the event of a seismic disturbance, a seismic clamp in the form of an angular bracket **48** is connected along the outer edge of the trolley chassis **45** by means of mounting bolts **49**. The distal end **50** of the angular bracket **48** captures the underside of the top flange **51** of the rail **34**. Such brackets **48** are also mounted along the opposite edge of the opposing wall trolley (not shown) in order to positively secure the wheels **46** of the trolley chassis **45** onto the rails **34**.

The floor **29** and side wall **30** of the L-shaped recess **28** is provided with a coating **53** of an epoxy compound, while the top portion of the wall adjacent to the recess **28** is clad with a sheet of stainless steel **54**. The epoxy coating **53** within the recess **28** and stainless steel cladding **54** along the top portion of the wall **24** facilitates the cleaning of this region of the hot cell 5 in the event that decontamination is necessary by providing a smooth, non-absorbent surface. The wall trolley **20** is powered by means of a power track **55** that receives a slidable electrical connector **57** which extends out from the edge of the trolley **20** as shown. The electrical connector **57** is received within a lateral slot **59** in the track **55**, and has a plurality of electrically conductive spring fingers **61** which engage ridge-shaped connectors **63** within the power track **55**, each of which transmits a different phase or control signal during the operation of the wall trolley **20**.

As has been previously indicated, there are two major shortcomings associated with the prior art, wall-type rail assembly **22** illustrated in FIG. 2. First, during the construction of this particular assembly **22**, it is very difficult to maintain the bed plate **31** flat and level while casting it in place along with the entire upper portion of the wall **24**. Further complicating this particular operation is the fact that the bed plate **31** of rail assembly **22** must be completely parallel with the bed plate **31** of the opposing rail assembly (not shown) on the opposite wall. Any departures from a level orientation of the plate **30** will result in the application of spurious gravitational forces on the wall trolley **20** which in turn will impair its smoothness of operation. If these departures go beyond certain tolerances, the entire upper portion of the wall **24** may have to be chiseled out and re-cast. A second shortcoming associated with such prior art rail assemblies **22** is their tendency to collect airborne radioactive contaminants in their various crevice regions, thereby rendering it difficult, if not impossible, to completely flush and rinse these contaminants out of the rail assembly **22** during a decontamination operation. Such contaminant-collecting crevice regions include the spaces **65** between the clamp plates **36*a*, 36*b*** and the lower flange **39** of the rail **34**, the section **67** of the floor **29** of the recess **28** between the side wall **30** and the rail **34**, the upper face **69** of the angular bracket **48** that serves as a seismic clamp, the upper surface **70** of the power track **55** and the interior **71** of the power track **55**. Airborne, dust-like contaminants can settle in these crevice regions and thereby become inaccessible to a direct spray of decontaminatin liquid. During the decontamination process, some of the particulate contaminants become liquidborne as a result of their contact with the liquid decontamination solution. Such liquidborne contaminants can collect in any of these crevice regions, and form "hot spots" in the rail assembly **22** when the liquid evaporates.

With reference now to FIG. 3, the improved wall rail assembly **75** of the invention includes a recess **77** having an overhanging portion **78**, as well as a floor **79** and a side wall **81**. The provision of the overhanging portion **78** results in a recess **77** having a C-shaped cross section that includes a ceiling **83**, in contrast to the prior art recess **28** having an L-shaped cross section comprised of only a floor **29** and side wall **30**. In the preferred embodiment, the overhanging portion **78** is dimensioned so that the resulting ceiling **83** is closely spaced over the top of the chassis **45** of the wall trolley **20**, thereby effectively capturing the chassis **45** and wheels **46** within the improved recess **77**. Such a structure obviates the need for angular brackets **48** or other forms of seismic clamps to hold the wheels **46** of chassis **45** over the rail **85** of the rail assembly **75** in the event of a seismic disturbance.

The rail **85** of the improved wall rail assembly **75** is preferably an angular piece of stainless steel having a load-bearing flange **87** that is level with the floor **79** of the recess 77, and a guide flange **89** that is parallel with the side of the wall **24**. The top surface of the load-bearing flange **87** bears the weight of the trolley chassis **45** through the wheels **46**, while the guide flange **89** coacts with the annular flanges **47** on the wheels **46** in order to help guide the same. In the particular embodiment of the invention illustrated in FIG. 3, the top surface of the load-bearing flange **87** is co-planar with the rest of the floor **79** of the C-shaped recess 77, which eliminates the previously referred to contaminant-collecting crevice **67** associated with the prior art rail assembly **22** illustrated in FIG. 2. The end result of the FIG. 3 rail assembly design is a floor **79** which is flat, level, crevice-free and completely accessible to a direct spray of a decontamination liquid over all its area.

Imbedded in the base portion **90** of the concrete wall **24** just below the rail **85** is a right angular guide rail **91**. The upper flange **93** of the guide rail **91** is preferably oriented level, while the side flange **85** is oriented parallel to the side of the wall **24**. As will be discussed in more detail hereinafter, the principal purpose of the guide rail **91** is to provide a guide for the rail **85** during the pouring of the top of the wall over base portion **90** which helps maintain the load-bearing flange **87** both flat and level. The lower edge of the guide flange **89** of the rail **85** is affixed to the upper edge of the side flange **95** of the guide rail **91** by means of a weld bead **97** as shown.

The improved rail assembly **75** further includes a reinforcing bar **100**. Bar **100** is imbedded in the concrete immediately below the floor **79** of the recess **77** but above base portion **90** to reinforce the concrete layer **92** supporting the load-bearing flange **87** of rail **85**. The reinforcing bar **100** includes a plurality of wire posts **102*a*, 102*b*** distributed all along its length, which structurally reinforces the concrete in this area and helps prevent it from cracking or chipping. These wire posts **102*a*, 102*b*** are directly connected to the interior of the angular rail **85** by means of a plurality of Nelson studs **104*a*, 104*b*** and straps **106**. The interconnection between the rail **85** and the wire posts **102*a*, 102*b*** not only helps the reinforcing bar **100** to lend support to the rail **85** within the concrete matrix surrounding the bar **100** and the interior of the rail **85**, but also serves to support the rail **85** in a flat and level position when the concrete that forms the floor **79** of the recess is poured.

A power track **55** is disposed in the upper left hand corner of the recess **77** as shown. Like the previously described power track, track **55** receives an electrical connector **57** mounted on a chassis **45** of the trolley **20** through a slot **59**. This slidable electrical connector **57** includes a plurality of fingers **61** which slidably engage ridge-shaped connectors **63** mounted in parallel within the interior of the power track **55**. However, unlike the power track **55** shown in FIG. 2, the slot **59** is disposed downwardly so that liquidborne radioactive contaminants can easily drain out of the interior **71** of the track **55**. Such an orientation of the slot **59** further discourages airborne radioactive contaminants from collecting within the track interior **71**. A further difference between the power track **55** illustrated in FIG. 3 and the power track **55** illustrated in FIG. 2 is the fact that the upper surface **70** of the track **55** illustrated in FIG. 3 directly abuts the ceiling **83** of the recess **77**. This abutment between the ceiling **83** of the recess **77** and the upper surface 70 of the power track 55 in the FIG. 3 embodiment of the invention has the effect of eliminating another one of the contaminant-collecting areas characteristic of prior art rail assemblies 22 of the type illustrated in FIG. 2.

As is evident from FIG. 3, the entire C-shaped cross section of the recess 77 of the improved wall rail assembly 75 is clad with a sheet 108 of stainless steel. In this preferred embodiment the lower edge 110 of the stainless steel sheet cladding 108 abuts and is formed level with the outer edge 109 of the load-bearing flange 87 of the rail 85, thereby providing a smooth, level and crevice-free floor 79 within the recess 77. A weld bead 114 preferably connects edge 110 of the cladding 108 with the edge 109 or the flange 87. If desired, a flat wire cable 112 may be disposed along the floor 79 of the recess 77. Such a cable 112 may be used to mechanically pull the chassis 45 of the wall trolley 75 in the event of an electrical failure. To complete the structure 75, the side of the wall 24 is clad with a sheet 113 of stainless steel.

FIG. 4 illustrates an alternative embodiment of the improved wall rail assembly 75. In this alternative embodiment, the load-bearing flange 87 of the rail 85 is situated flush with the concrete forming the floor 79 of the recess 77, instead of being flush with the stainless steel sheet cladding 108. While this particular configuration forms a small ridge in the floor 79 where the outer edge 110 of the stainless steel sheet cladding 108 overlaps the outer edge 109 of the load-bearing flange 87 of the rail 85, it is easier to install. Moreover, the small ridge caused by the overlapping of the cladding 108 of the edge of the flange 87 is not a crevice-forming structure. Indeed, this overlapping joint may be considerably smoothed out by the application of the weld bead 114 thereby rendering the floor 79 of the recess 77 substantially flat. It should be noted that the weld bead 114 not only joins the cladding 108 to the rail 85 in both embodiments, but further acts as a mositure barrier which prevents liquidborne radioactive contaminants from seeping under the cladding 108 and becoming absorbed in the concrete immediately therebelow.

In contrast to the prior art rail assembly illustrated in FIG. 2, the structure of the improved rail assembly 75 of the invention renders it easy to manufacture a wall rail that is flat, level and devoid of crevice regions. In the method of constructing the improved wall rail assembly 75, the support wall 24 is first poured up to the lower dotted line illustrated in FIG. 3 to form the base portion 90 of the wall 24. Before this concrete hardens, the reinforcing bar 100 is placed over the top of the concrete so that its wire posts 102*a*, 102*b* extend into the non-hardened concrete in the position illustrated in FIG. 3. Additionally, the guide rail 91 is placed in the position illustrates in FIG. 3 so that its upper flange 93 is substantially flat and level.

In the next step of the construction method, the rail 85 is placed into the position illustrated in FIG. 3 with its load-bearing flange 87 both flat and level. The rail 85 is then secured in this position by the installation of Nelson studs 104*a*, 104*b* and straps 106 which are tack welded between the wire posts 102*a*, 102*b* of the reinforcing bar 100, and the interior of the rail 85. In the FIG. 3 embodiment of the invention, the upper flange 93 of the guide rail 91 both guides and provides a place to secure the rail 85 in a proper position. A weld bead 97 is then applied between the lower edge of the guide flange 89 and the upper edge of the guide rail 91 to interconnect them. Weld bead 97 may be made intermittent, or continuous to form a back-up watertight joint that no decontamination liquid can leak into. By contrast, in the embodiment illustrated in FIG. 4, a small gap is allowed between the lower edge of the side flange 95 of the guide rail 91 and the guide flange 89 of the rail 85. Hence, the guide rail 91 functions neither to support the rail 85 or to secure it into its desired position. Instead, the positioning function is carried out exclusively by the Nelson studs 104*a*, 104*b* and straps 106. In both embodiments, before the concrete forming the top portion of the wall 24 is poured over the base portion, the upper edge of the stainless steel sheet cladding 113 applied over the side of the wall 24 is joined to the lower edge of the guide flange 89 of the rail 85 through a continuous weld bead 116 to form a watertight seal therebetween that the decontamination liquid cannot penetrate.

In the next step of the construction method, a layer 92 of concrete is poured over both the reinforcing bar 100 and the bottom side of the rail 85 up to the upper dotted line. The concrete in the layer 92 and the reinforcing bar 100, wire posts 102*a*, 102*b*, Nelson studs 104*a*, 104*b* and straps 106 create a strong supporting matrix beneath the load-bearing flange 87 of the rail 85 after the concrete hardens. The pouring of a relatively small layer of concrete 92 at this juncture makes it very easy to maintain the flange 87 both flat and level, and to create a floor 79 flor the recess 77 that is likewise flat and level. It should be noted that, in the FIG. 4 embodiment, the concrete forming the layer 92 is not poured completely flush with the upper surface of the load-bearing flange 87, but slightly lower to receive the bottom flange of the cladding 108.

In the last step of the construction method, the upper portion of the wall 24 that includes the recess 77 is constructed. This is preferably accomplished by bending the stainless steel sheet cladding 108 so that it has the exact C-shaped profile that is desired for the improved recess 77. Next, the cladding is placed into the position shown in FIG. 3 and its edge is welded to the edge 109 of the load-bearing flange 87 of the rail 85. Finally, the concrete is poured above and to the side of the cladding 108, which advantageously acts as a form that shapes the side wall 81 and overhanging portion 78 of the recess 77.

The method of construction in the FIG. 4 embodiment is essentially the same, the primary difference being that the concrete forming the floor 79 of the recess can be poured flush with the top surface of the load-bearing flange 87 instead of a fraction of an inch therebelow to accommodate the bottom flange of the cladding 108.

I claim:

1. An improved crevice-free rail assembly particularly adapted for use with an electrically operated crane trolley in an environment exposed to airborne and liquidborne radioactive contaminants, comprising a pair of opposing support walls, and an elongated rail-housing recess in each of said walls that has a floor and a ceiling, said floor being defined at least in part by the load-bearing surface of a rail, and each of said floors of said recesses being substantially flat, level and crevice-free to facilitate the drainage of liquids out of the recesses, said ceiling overhanging said wheels to capture and secure said wheels within said recess, and said rail being supported within said wall by a plurality of reinforcing members that are encased in a moldable construction material.

2. The improved rail assembly of claim 1, wherein each rail-housing recess receives at least two trolley wheels.

3. The improved rail assembly of claim 1, wherein one of said recesses includes a power track means having a slot along its longitudinal axis for receiving a sliding electrical connector from the crane trolley.

4. The improved rail assembly of claim 3, wherein said power track means is mounted in its respective rail-housing recess above the substantially flat and crevice-free floor.

5. The improved rail assembly of claim 4, wherein said slot is located at the bottom of said power track means to facilitate the drainage of liquidborne contaminants therefrom and to discourage the collection of airborne contaminants within said slot.

6. The improved rail assembly of claim 2, wherein the ceilings of said recesses are both substantially flat and level.

7. The improved rail assembly of claim 1, wherein each of said recesses is lined with a corrosion-resistant material.

8. An improved crevice-free rail assembly particularly adapted for use with a crane trolley in an environment exposed to airborne and liquidborne radioactive contaminants, comprising a support wall, and a rail-housing recess in said wall for receiving the wheel of a crane trolley, wherein said recess has a floor defined at least in part by the load-bearing surface of a rail which is substantially flat, level and crevice-free to faciliate the drainage of liquids out of the recess, and a ceiling that overhangs said wheel to capture and secure it within the recess in the event of seismic disturbance, wherein said rail is supported within said wall by a matrix that includes at least one reinforcing member that is encased in a moldable construction material, said member serving to secure said rail in a flat and level position when said moldable construction material is poured therearound.

9. The improved rail assembly of claim 8, wherein said recess includes a power track means having a slot along its longitudinal axis for receiving a sliding electrical connector from the crane trolley.

10. The improved rail assembly of claim 9, wherein the power track means is mounted in the rail-housing recess above its floor, and said slot is located along the bottom of said power track means to facilitate the drainage of liquidborne contaminants out of said power track means, and to discourage the accumulation of airborne contaminants in said track means.

11. The improved rail assembly of claim 8, wherein all but the load-bearing surface of said rail is substantially embedded in said matrix.

12. The improved rail assembly of claim 8, wherein the bottom of said matrix includes a guide rail for facilitating the positioning of said rail prior to the application of said moldable construction material over said reinforcing member and over all but the load-bearing surface of the rail.

13. The improved rail assembly of claim 10, wherein said recess includes a side wall, and said power track means is mounted in the corner of the recess defined by the junction of the side wall with the ceiling.

14. The improved rail assembly of claim 8, wherein said recess is lined with a corrosion-resistant material.

15. The improved rail assembly of claim 8, wherein the recess has a substantially rectangular cross section.

16. An improved rail assembly particularly adapted for use with a crane trolley in an environment exposed to airborne and liquidborne radioactive contaminants, comprising a pair of opposing support walls, each of which includes a rail-housing recess that receives opposing wheels of a crane trolley, and each of which has a floor and a ceiling, said floor being defined at least in part by the loadbearing surface of a rail and being substantially flat, level and crevice-free to facilitate the drainage of liquids out of the recess, said rail being supported within said wall by a matrix formed by at least one reinforcing member encased within a moldable construction material, said member serving both to secure said rail in a flat and level position when said moldable construction material is poured therearound, and to support said rail during use, and said ceiling overhanging said wheel to capture and secure said wheels within said recess, wherein said recess further includes a power track means mounted along a corner of the recess above the floor thereof to facilitate drainage of liquidborne contaminants, and to discourage the accumulation of airborne contaminants in said track means.

17. The improved rail assembly of claim 16, wherein said power track means includes a slot for receiving a sliding electrical connector from the crane trolley, and wherein said slot is oriented to facilitate drainage of liquidborne contaminants out of said power track means.

18. The improved rail assembly of claim 16, wherein all but the load-bearing surface of said rail is substantially embedded in said matrix.

19. The improved rail assembly of claim 18, wherein the bottom of said matrix includes a guide rail foro facilitating the positioning of said rail prior to the application of said moldable construction material over said reinforcing member and over all but the loadbearing surface of the rail.

20. The improved rail assembly of claim 16, wherein said recess is lined with a corrosion-resistant material.

21. The improved rail assembly of claim 16, wherein said recess includes a side wall which is substantially orthogonal to the floor.

22. The improved rail assembly of claim 16, wherein the recess has a substantially rectangular cross section.

23. The improved rail assembly of claim 16, wherein the recess has a substantially rectangular cross section.

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